

REMARKS

This is in full and timely response to the Office Action dated December 29, 2004. Reexamination in light of the amendments and the following remarks is respectfully requested.

Claims 5 and 7-24 are currently pending in this application with claims 5 and 9 being independent.

No new matter has been added.

Rejections under 35 U.S.C. §102 and §103

Claims 5 and 8 were rejected under 35 U.S.C. §102 as allegedly being anticipated by U.S. Patent No. 6,194,837 Ozawa.

Claim 6 was rejected under 35 U.S.C. §103 as allegedly being obvious over Ozawa in view of U.S. Patent No. 5,121,029 Hosokawa et al. (Hosokawa).

Claim 7 was rejected under 35 U.S.C. §103 as allegedly being obvious over Ozawa in view of Hosokawa and in further view U.S. Patent No. 6,087,772 to Ootuski et al. (Ootuski).

If the allowance of the claims is not forthcoming at the very least and a new grounds of rejection made, then a **new non-final Office Action** is respectfully requested at least for the reasons provided hereinbelow.

This rejection is traversed at least for the following reasons.

The features of claim 6 have been wholly incorporated into claim 5 to place claim 6 into independent form. Thus, prior claim 6 is now amended claim 5.

Claim 5 is drawn to a method for manufacturing a display apparatus including a substrate, a plurality of pixels formed on said substrate, and a barrier plate for separating adjoining pixels of said pixels from each other, each of said pixels having a lower layer portion

including a wiring formed on said substrate, an upper portion including an organic electro-luminescent element, and a middle layer portion for insulating said lower layer portion and said upper layer portion from each other electrically, said method comprising the steps of:

forming said lower layer portion including the wiring on said substrate;

forming said middle layer portion so as to cover said lower layer portion;

forming a contact hole connected with the wiring in said middle layer;

forming said organic electro-luminescent element on said middle layer portion to connect said organic electro-luminescent element with the wiring in said lower layer portion through the contact hole formed in said middle layer portion; and

disposing said barrier plate so as to overlap with a region including the contact hole, wherein:

said step of forming said organic electro-luminescent element is to form said organic electro-luminescent element composed of a reflective anode connected to said wiring, a transparent cathode disposed at a front face of said organic electro-luminescent element, and an organic layer held between the anode and the cathode, and

the organic layer emits light by recombination of a hole supplied from the anode and an electron supplied from the cathode, and further

the emitted light is taken out of the cathode disposed at the front face.

Claim 5 teaches the step of forming a contact hole connected with the wiring in the middle layer, and teaches the step of forming the organic electro-luminescent element on the middle layer portion to connect the organic electro-luminescent element with the wiring in the lower layer portion through the contact hole formed in the middle layer portion.

Additionally, within claim 5, the step of forming the organic electro-luminescent element is to form the organic electro-luminescent element composed of a reflective anode

connected to the wiring, a transparent cathode disposed at a front face of the organic electro-luminescent element, and an organic layer held between the anode and the cathode.

Ozawa arguably teaches a contact hole 65 (Ozawa at figure 8(E), column 9, lines 57), a wiring 41 in the middle layer 52 (Ozawa at figure 8(F)), and an opposite electrode "op" (Ozawa at figure 8(G), column 8, lines 22-23).

The Office Action characterizes Ozawa as failing to disclose, teach or a reflective anode and a transparent cathode.

In response to this characterization, Ozawa does indeed teach the existence of a reflective anode and a transparent cathode. For example, Ozawa teaches an opposite electrode "op" of aluminum containing lithium or calcium (Ozawa at figure 8(G), column 8, lines 22-23), wherein the opposite electrode "op" is positive electrode (Ozawa at column 8, lines 29-33). Moreover, Ozawa teaches a transparent pixel electrode 41 (Ozawa at column 8, lines 39-40), wherein the pixel electrode 41 is a negative electrode (Ozawa at column 8, lines 29-33). Also within Ozawa, the light emitted from the luminescent element 40 is reflected by the opposite electrode "op" and output to the outside via the transparent pixel electrode 41 and the transparent substrate 10 (Ozawa at column 8, lines 38-40).

Although Ozawa arguably teaches lower layer portion including a wiring 35 on the substrate and a contact hole 65 connected with the wiring 35 in middle layer 52 (Ozawa at figure 8(E)), Ozawa fails to disclose, teach or suggest the opposite electrode "op" (a reflecting anode) being connected to the wiring 35, and fails to disclose, teach or suggest the pixel electrode 41 (a transparent cathode) being disposed at a front face of the organic electro-luminescent element (Ozawa at figure 8(G)).

The Office Action provides Hosokawa for the features deficient within Ozawa.

Hosokawa arguably teaches the existence of a reflective anode and a transparent cathode. For example, Hosokawa teaches gold electrode as an anode and ITO electrode as a cathode (Hosokawa at column 79, lines 63-64, column 81, lines 2-3 and 36-37, column 82, lines 2-3).

However, Hosokawa fails to disclose, teach or suggest a lower layer portion including a wiring on the substrate and a contact hole connected with the wiring in middle layer (Hosokawa at figure). Moreover, Hosokawa teaches the presence of an ITO transparent layer on the substrate (Hosokawa at column 54, lines 32-33, column 55, lines 1-2 and 32-34, column 56, lines 1-2 and 57-58, column 57, lines 46-47, column 58, lines 30-31, column 59, lines 6-7, 19-20, and 37-38, column 60, lines 27-28). Other examples are found throughout Hosokawa. Yet, Hosokawa fails to disclose, teach or suggest failing to teach a reflective layer on the substrate and a transparent cathode disposed at a front face of said organic electro-luminescent element.

Ootuski arguably teaches a display device having an anode 2 on a substrate 1 and a cathode 5 over the anode 2 (Ootuski at figure 3E). However, anode 2 of Ootuski is transparent electrode and is not a reflective anode (Ootuski at column 4, lines 53-61). Furthermore, cathode 5 is a metal electrode and is not a transparent cathode (Ootuski at column 5, line 8).

Withdrawal of this rejection and allowance of the claims is respectfully requested.

New claims

Newly added claim 9 is drawn to a method for manufacturing a display apparatus comprising:

forming a lower layer portion on a substrate, said lower layer portion including connecting wiring;

forming a middle layer portion on a lower layer portion, said middle layer portion having a contact region and a light emitting region;

forming a contact hole within said middle layer portion, said contact hole being disposed at said contact region;

forming a reflective layer on said middle layer portion, said reflective layer being formed at said contact region and at said light emitting region, said reflective layer being electrically connected with said connecting wiring through said contact hole;

forming a barrier plate over said contact region, said reflective layer being exposed within said light emitting region;

forming an organic layer over said reflective layer, said organic layer being formed over said light emitting region; and

forming a transparent layer over said organic layer,

wherein said reflective layer, said organic layer and said transparent layer form an organic electro-luminescent element.

At least for the reasons provided hereinabove, Ozawa, Hosokawa and Ootuski, either individually or in combination, fail to disclose, teach or at least suggest the step of forming a reflective layer on said middle layer portion, said reflective layer being formed at said contact region and at said light emitting region, said reflective layer being electrically connected with said connecting wiring through said contact hole.

Allowance of the claims is respectfully requested.

Conclusion

For the foregoing reasons, all the claims now pending in the present application are allowable, and the present application is in condition for allowance. Accordingly, favorable reexamination and reconsideration of the application in light of the amendments and remarks is courteously solicited.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone Brian K. Dutton, Reg. No. 47,255, at 202-955-8753 or the undersigned attorney at the below-listed number.

If any fee is required or any overpayment made, the Commissioner is hereby authorized to charge the fee or credit the overpayment to Deposit Account # 18-0013.

Dated: March 29, 2005

Respectfully submitted,

By 

Ronald P. Kananen

Registration No.: 24,104

RADER, FISHMAN & GRAUER PLLC

1233 20th Street, N.W.

Suite 501

Washington, DC 20036

(202) 955-3750

Attorney for Applicant